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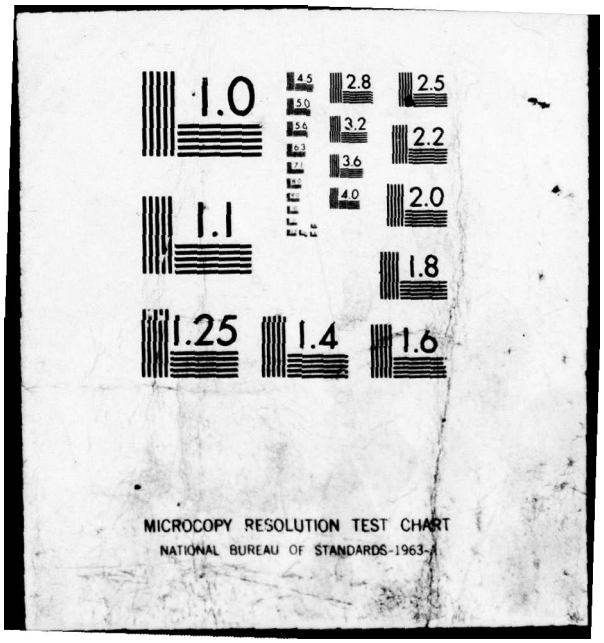
1.0
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6.3
MICROCOPY RESOLUTION TEST CHART
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THE NAVAL OCEANOGRAPHIC OFFICE NUMERICAL ICE FORECASTING SYSTEM OPERATIONS MANUAL

by

Lester B. Owens, Jr.
Donald J. Gerson

U. S. Naval Oceanographic Office
Washington, D. C. 20373

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Standard computer deck set-ups and data tapes of the Numerical Ice Prediction System are specified for each day of the week. Methods for temperature forecast inputs, limits changes, expanded charts and temperature regime reversals are given.

ABSTRACT

Instructions are given for operators of the NAVOCEANO Numerical Ice Prediction System. The standard computer deck set-ups and data tapes are specified for each day of the week. Methods are also given for special operations such as temperature forecast inputs, limits changes, expanded charts and temperature regime reversals. An analysis of potential problems and their respective solutions are included.

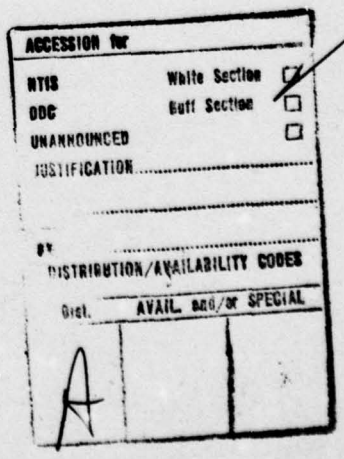

TABLE OF CONTENTS

FIGURES

TABLES

INTRODUCTION

The purpose of this manual is to describe how to operate the Naval Oceanographic Office Numerical Ice Forecasting System on the Univac 1108 computer. It specifically details such precedures as deck set up, what cards to punch, card sequence, output deck and listing breakdown, data tape cycle, and what to do about problems when they occur.

Details of the program, algorithms, and methods used by the system are available from Gerson (1975), and will not be included in this report.

The system has been designed to be as error proof as possible, but runs can be destroyed by not recognizing errors over repeated operations. Review the following paragraphs thoroughly before using the system.

DECK SET-UP

Listings of the basic deck set-up are shown as figures 1-6. They display the cards which may change from day to day. The @RUN card is only changed if the amount of run time, pages, or cards are to change. Use 10 minutes, 200 pages, 1500 cards on Monday and Tuesday and 2 minutes, 100 pages, 300 cards the rest of the week. Consideration must be taken for missed days. Estimate an extra 2 minutes, 20 pages, and 300 cards per extra day.

The first @ASG card shows the data tapes to be used on the run. Data tapes should be used as shown in Table 1. If Monday is a holiday, all the Monday plus the Tuesday tapes are used on Tuesday. During periods of

Gerson, D.J., A Numerical Ice Prediction System, RP-8, Naval Oceanographic Office, Washington, D. C. 1975

```
@FIN
@ADD,P  PF*040DJG.RUNSA
                                                        99.9
                    CORRECTION CARDS GO HERE
05  (FLAG CARD)
@XQT  PF*040DJG.DCALCABS
@ADD,P  PF*040DJG.RUNS
@SETC  1  .  NORMAL RUN
@ASC,P  FP040DJG,F2
@ASG, TIMES DATAP,8C,770052/770053/770054/770055/770056/770057
@RUN,/TPC 9U1DJG,HBRBB,04041X07720,10,300/2000 GERSON CALCDEG
```

Figure 1 - Program Deck Set-Up - Monday

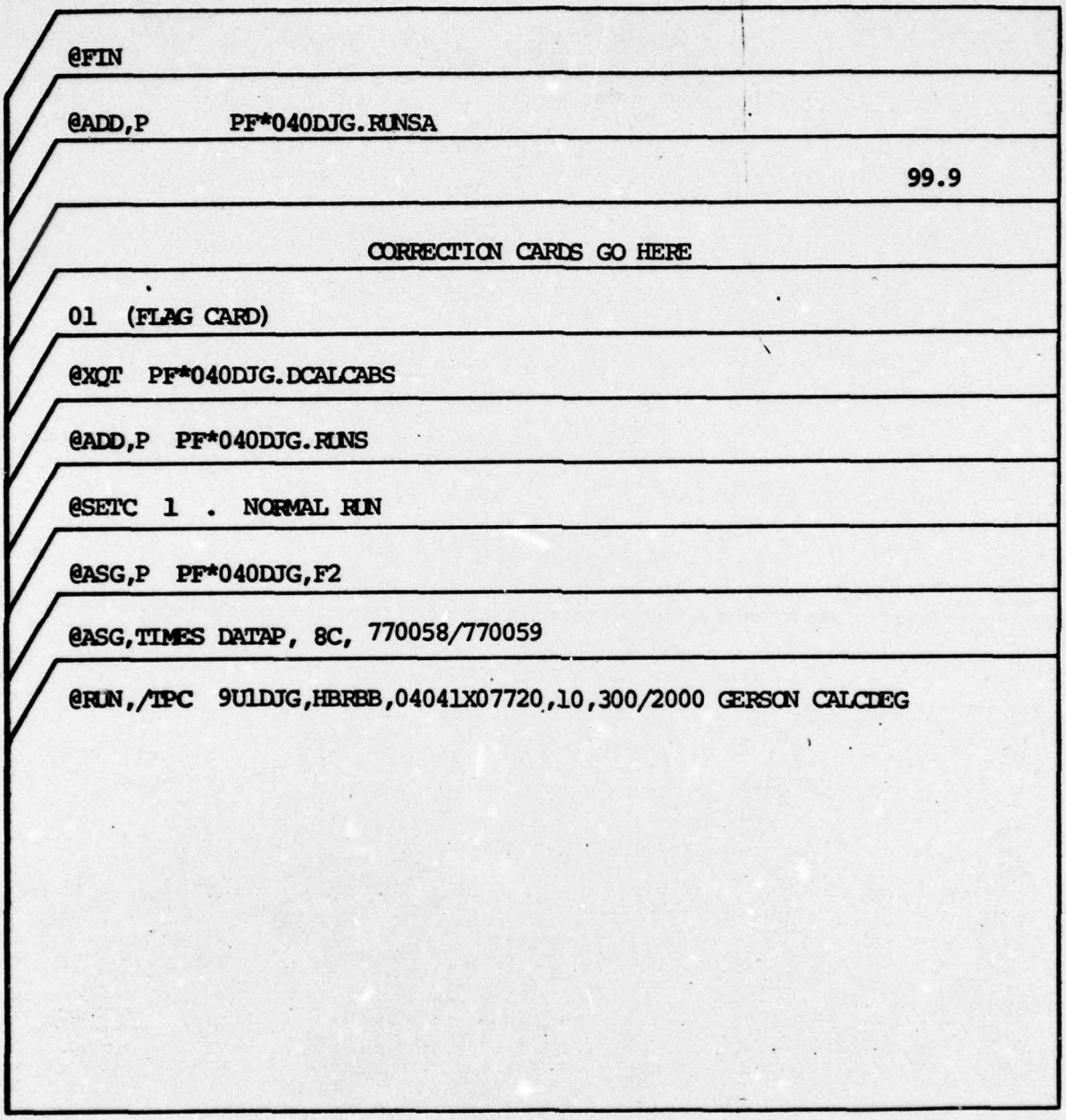

Figure 2 - Program Deck Set-Up - Tuesday

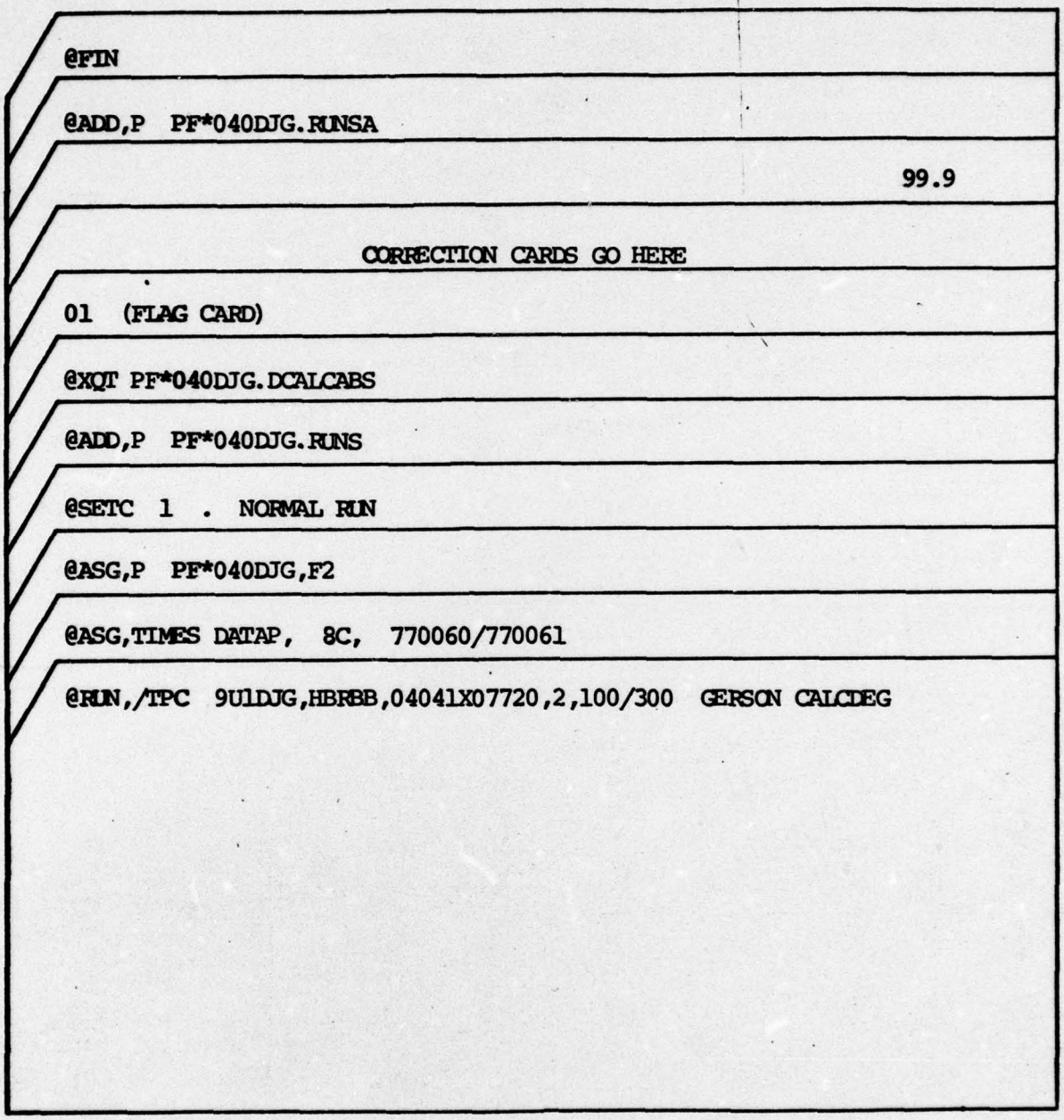

Figure 3 - Program Deck Set-Up - Wednesday

```
@FIN
@ADD,P  PR*040DJG.RUNSA
                                                        99.9
                        CORRECTION CARDS GO HERE
01  (FLAG CARD)
@XQT  PF*040DJG.DCALCABS
@ADD,P  PF*040DJG.RUNS
@SETC  1  .  NORMAL RUN
@ASG,P  PF*040DJG,F2
@ASG,TIMES, DATAP, 8C,  770062/770063
@RUN,/TPC  9U1DJG,HBRBB,04041X07720,2,100/300  GERSON CALCDEG
```

Figure 4 - Program Deck Set-Up - Thursday

```
@FIN
@ADD,P  PF*040DJG.RUNSA
                                                        99.9
                    CORRECTION CARDS GO HERE
01  (FLAG CARD)
@XQT  PF*040DJG.DCALCABS
@ADD,P  PF*040DJG.RUNS
@SETC  1  .  NORMAL RUN
@ASG,P  PF*040DJG,F2
@ASG,TIMES, DATAP, 8C,  770050/770051
@RUN,/TPC  9U1DJG,HBRBB,0401X07720,2,100/300 GERSON CALCDEG
```

Figure 5 - Program Deck Set-Up - Friday

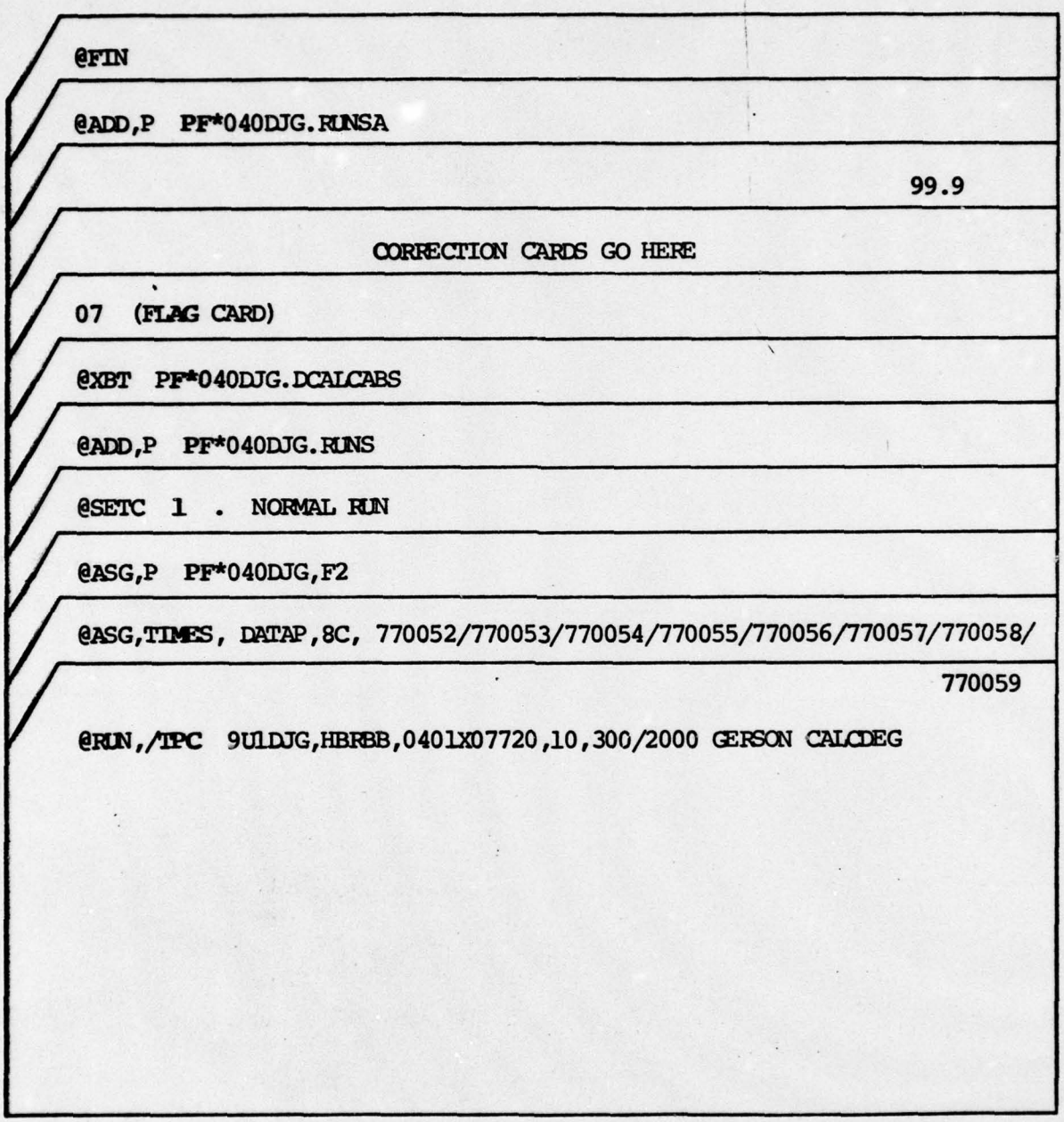

Figure 6 - Program Deck Set-Up - Monday Holiday
(Run on Tuesday)

TABLE 1

SEQUENCE OF DATA TAPES

Tape No.	Day of Collection	Time of Collection	Day Tape is used
770052	Friday	14Z	Monday
770053	Saturday	02Z	Monday
770054	Saturday	14Z	Monday
770055	Sunday	02Z	Monday
770056	Sunday	14Z	Monday
770057	Monday	02Z	Monday
770058	Monday	14Z	Tuesday
770059	Tuesday	02Z	Tuesday
770060	Tuesday	14Z	Wednesday
770061	Wednesday	02Z	Wednesday
770062	Wednesday	14Z	Thursday
770063	Thursday	02Z	Thursday
770050	Thursday	14Z	Friday
770051	Friday	02Z	Friday

non-daylight savings time it is possible to advance the tape schedule by one tape, so that if desired, on Tuesday use 770059 and 770060, Wednesday use 770061 and 770062, etc.

DATA CARDS

The portion of the runstream after the @XQT card, which is the set of data cards presented to the system, varies on a daily basis. The layout is depicted in Table 2. The first card after @XQT is a flag card which indicates to the system what cards are to follow. Columns 1 and 2 contain a two digit number giving the number of tape changes that will be required (one less than the number of tapes to be used). On a normal day 2 tapes are used, so one change will be required, and 01 is punched in columns 1 and 2.

COORDINATE CARDS

If it is desired to amplify the display of ship report density by expanding one of the ten degree squares so that it depicts density within each of its constituent one degree squares, it is necessary to punch the number of the expansions in columns 5-6 of the flag card and punch a coordinate card for each expansion. The enclosing latitudes are punched in columns 1-3 and 6-8 and the longitudes are punched in columns 11-13 and 16-18. See Table 2 for details and Table 3 for card sequence.

TABLE 2

SAMPLE SET OF DATA CARDS

Type	No. of Tape Changes	No. of Coordinate Cards	Forecast Flag	No. of Reversals	Limits Change Flag	Surpress Date Time Check
Flag Card	01	02	01	03	01	01
Limits Change	@ADD 9	*040DG8.OCT72				
Reversal Cards	04202 15 20744 08 72900 03					
Coordinate Cards	030 040 010 020 000 010 210 220					
Forecast Card	184030+05+03+01+00-09-10-04					
Correction Cards - columns		27-30	44-45	55-59		
		70133	12	20.0		
		.	.	.		
		.	.	.		
		.	.	.		
		70218	06	99.0		
		.	.	.		
		.	.	.		
		.	.	.		
		74082	18	-22.0		
				99.9		

NOTE: For correction cards, decimal point in temperature is always in column 58.

TABLE 3

PUNCH FORMAT OF SPECIAL DATA CARDS

REVERSAL CARDS

Column	Data
1-5	Station Number
8-9	Days since reversal

COORDINATE CARDS*

1-3	Latitude from
6-8	Latitude to
11-13	Longitude from
16-18	Longitude to

FORECAST CARD

1-3	First day to be changed**
4-6	Number of days to be changed
7-33	Temperature bias in whole degrees Fahrenheit (+or-) for each station in order

*Coordinates must be in even 10° (e.g., 150) and longitudes are 360° compass going west from Greenwich.

**June 16 is taken as day number 1, days are then number 1-365 until the following June 16 when the sequence is started with day 1 again.

TEMPERATURE FORECAST INPUT

The ice thickness and degree day forecasts output by this system utilize a file which contains observed, forecast and normal temperatures for each of the nine forecast stations. The forecast temperatures in this file are updated twice per month by in put of expected deviations from normal as provided by a meteorologist.

These deviations are input on a single card in the runstream as shown in Table 2 and 3. The card is punched as follows:

1-3	First day of forecast (*)
4-6	Number of days of forecast (*)
7-9	Deviation for Thule
10-12	Deviation for Clyde River
13-15	Deviation for Goose
16-18	Deviation for Sondrestrom
19-21	Deviation for Frobisher
22-24	Deviation for Cape Dyer
25-27	Deviation for Hopedale
28-30	Deviation for Cartwright
31-33	Deviation for Resolution Is.

The fact that a forecast is being entered is indicated by a "1" punch in column 10 of the flag card. The forecast card follows that, (unless reversal cards or coordinates cards are used).

The forecast is entered only once. It will not cause problems if repeated, but this is not necessary. However, if the card after the XQT card has a "1" in column 10 a forecast card must be in the deck.

Deviations are 3 digit integers, e.g., +11 or -02 etc.

*Coding of first day and number of days. Normally, 30-31 day forecasts are made; begin the forecast card with the six digits shown for the intial date of the forecast, in Table 4.

TABLE 4

EQUIVALENT ENTRIES FOR INITIAL FORECAST DATE

July 1	015031
July 15	030031
August 1	046031
August 15	062031
September 1	078030
September 15	093030
October 1	108031
October 15	123031
November 1	139030
November 15	154030
December 1	169031
December 15	184031
January 1	200031
January 15	215031
February 1	231030
February 15	246028
March 1	260030
March 15	274030
April 1	290030
April 15	305030
May 1	320030
May 15	335030
June 1	000365*
June 15	000030

*Reset - No temperatures are listed

Sample Forecast for September 15

Column 1 Column 33

093030+00-02-02-03-02-02-03

REVERSALS

When it is desired to reverse stations, change from accumulating frost degree days to accumulating warming degree days or the reverse, it is necessary to punch the number of reversals in columns 13 and 14 on the flag card and punch a card for each station to be reversed. The meteorologist will give the station number and the date of reversal. The station number is punched in columns 1-5 of the reversal card. Next determine the number of days since reversal to be entered on the card by subtracting the date of reversal from the first date of degree day accumulations to appear on the next listing. This number is punched in columns 8 and 9.

LIMITS CHANGE

This can only be done on a normal run since @SETC 4 must be used in the runstream. Column 18 is used to indicate if temperature limits are to be changed, 1 for a change, 0 or blank for no change. It is necessary to determine a month in the past in which the first day of that month has the limits desired. Place a @ADD card immediately after the flag card using a file name *040DG8 and an element name which is the abbreviated month and year (e.g., @ADD *040DG8. OCT74), , and follow that with a card punched with a "9" in column 1. The "9" card is necessary since the tape file added to the runstream contains many more card images than are required. These are flushed by the program until a "9" is encountered.

SURPRESSING DATE TIME CHECK

If it is necessary to surpress the date and time check, column 22 is used on the flag card. This may be necessary if a data tape is missing or bad. For surpressing, a "1" is punched in column 22, for non-surpressing a zero or blank is used in column 22.

CORRECTION CARDS

Correction cards follow after the special cards, described above. The correct temperatures are obtained from a meteorologist who will write these temperatures adjacent to each 99.0 or 99.5 temperature in the listing. Figure 7 is a useful locator chart to aid the meteorologist in providing these temperatures and also depicts the locations of all stations in the network. The correction cards are punched as follows: columns 27-31 station number, column 44 and 45 time, columns 55-59 temperature with the decimal point in column 58.

PUNCHING CORRECTION CARDS

1. Use blue corrections for program control.
2. Put "99.9" card in front of deck to be punched (99.9 in columns 56-59).
3. Before engaging program control put "99.9" card in center station, first card to be punched in right station, then engage program control. If cards do not move to position, punch SKIP.
4. Punch temperatures top to bottom and left to right. Cards should match stations which have missing temperatures. Keep checking that they do. If a card is mis-punched, punch the station in column 27 and time in column 44 of a new card and put it back in sequence.
5. When cards are finished put 99.9 card in back.
6. NOTE: When multiple days of corrections are being punched, there must be a 99.9 card after each day.

BREAKING DOWN OUTPUT DECK

1. The card output consists of three parts:
   (1) Temperature cards
   (2) Corrected degree day cards
   (3) Correction cards

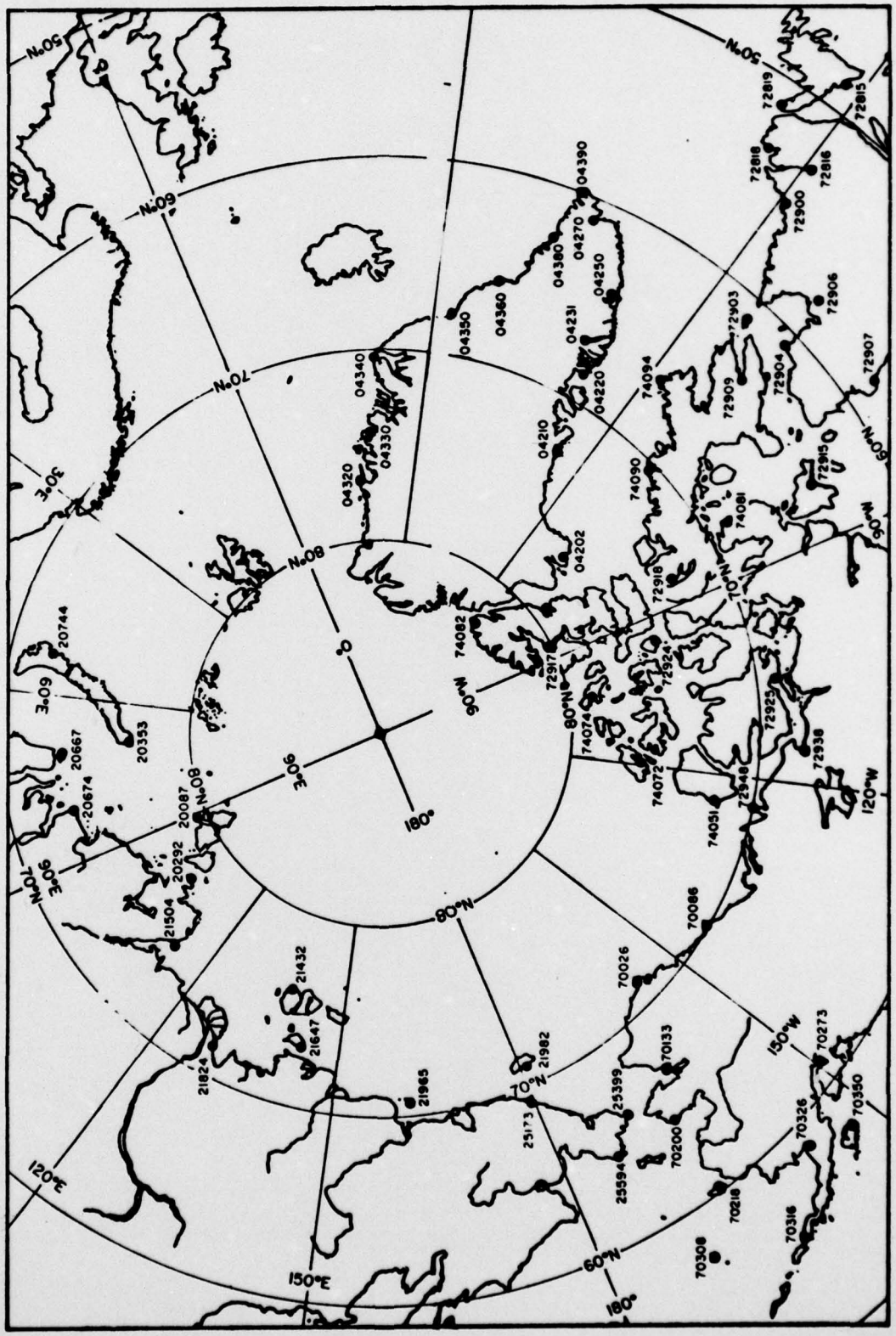

Figure 7. Locations of stations in network

2. Temperature cards are dated in columns 24-33. There will be one set for each day of raw data processed. Mark date and file these cards.

3. Degree day cards are undated but there are exactly 62 ordered cards for each day which has been corrected beginning with 04020 in columns 1-5 of the first card and ending with 74094 in columns 1-5 of the 62nd card. Mark date, and file these cards. If there is one set it will be for the date previous to the date of the first temperature cards.

4. Correction cards are the most difficult to separate since they are not dated, and the number of cards varies from day to day. It is best to check the ascending order of the station numbers. When the station numbers reverse sequence, the new day begins. Find that spot in the deck and mark it. Of course, if there is only one day to correct, there is no problem. Correction cards are filed after use but only 1 month of cards are kept.

PROBLEMS

Problems have occasionally occurred due to a number of reasons including: (1) bad data tapes, (2) set-up error, (3) computer failure, (4) computer operator error, etc. Those that have been observed to date will be noted in this section by describing the symptoms and corrective action. If errors other than those described occur, it will be necessary to consult a computer analyst or a programmer closely familiar with the system. Reference to Gerson (1975) is recommended.

1. Program runs through to the end (@FIN) but output contains a message that a date or time error was detected.

This can be caused by several errors and the user must determine which is responsible. The error message gives the date and time expected for the raw data and the date and time it was received. One of these must be wrong. If

the date and time expected is wrong then either the previous run did not finish properly or the disk files were lost. First check the rear end of the previous run and see if it terminated properly. If it did not, determine the cause and rerun the previous run. This may require assistance from "open shop" since two consecutive runs ran incorrectly.

If the previous run did finish correctly the problem is with the lost disk files. Check with "open shop" before preceeding. If they were lost and are recoverable - wait until they are recovered and rerun with the job as a normal run using @SETC 1 in the runstream. If they are not recoverable it will be necessary to rerun the previous days using the @SETC 1 card.

If the date and time expected are correct but the date and time received are wrong, the problem is with the raw data. This is usually caused by tapes being mounted wrong in the computer room, but can also be caused by bad data on the tape. List the beginning of the tapes and determine if they contain the correct date-time group on the label. If they are correct, the problem is in the computer room and the job should be rerun with @SETC 2.

If the labels are not correct, try to find the correct tapes and rerun them in the correct order with @SETC 2. There will undoubtedly be some confusion with tape numbers for a few days, so check the tapes carefully before making future runs. If the correct tape cannot be found it will be necessary to substitute for the missing tape - some other tape with the proper times on it (0Z and 6Z or 12Z and 18Z) and punch a "1" in column 22 on the flag card (this surpresses the date and time check). Rerun the program using this tape(s) and @SETC 2. The data resulting will be incorrect, but no correction cards will be supplied since the data are not missing. It will be necessary to punch complete correction cards for these data.

2. Program runs through to the end but output contains message:

DATA IGNORED IN CONTROL MODE.

This is usually caused by an error in the correction card set up. It implies that data are to be found after all of the 99.9 cards have been read that are expected. It can be caused by a number of reasons such as all 99.9 cards left in front of the set of correction cards, or two left together somewhere in the deck. Another possible cause is a manually missed punch on a correction card. This has sometimes been caused by the decimal point being repreduced as an "8" then copying as an "8", thus e.g., 29.0 becomes 2980. This acts like a 99.9 to the system. In any case the remedy is to correct the descrepancy and rerun with @SETC 2.

Another possibility is a mispunched or misread runstream card. This could have serious implications, so the user should determine exactly what happened before rerunning the job.

3. Program runs through to the end but contains a message:

IST (1) = i IST (2) = j IST (3) = ***

This is symptomatic of problems which can occur when the program is reading in the data tapes. If IST (1) = 3 and IST (2) = 6 or less it indicates parity problems. The program attempts to correct this and if the message is repeated four or less times it can be ignored. (It would be a good idea, however, to have the tape cleaned.) If the message is repeated five times the data input is aborted. In any other case the data input will have been aborted when one message was printed. It is necessary for the user to determine how much data was read. It is always safe to rerun the job with @SETC 2. It may be possible, however, by examining the listing of file 040DG1, to save the data which have already been processed. Any full tapes which have been processed can be saved by simply

doing any necessary corrections and beginning the next day's run with the first tape not read. Be very careful to check the listing before making this decision. If, for example, the read aborted just after reading the label of 12Z-18Z data tape, the program will assume that the tape in question was read and will be looking for corrections for all those (12Z-18Z) missing temperatures. In this case it would be best to rerun the entire run. A word of caution is necessary regarding parity errors (IST (1) = 3 IST (2) = 6 . . .). When any are encountered some action should be taken, such as cleaning or stripping the tape. If five messages are encountered on consecutive runs of the same tape, the remaining data on that tape may not be recoverable. The data can then be filled in with correction cards and the next job is run beginning with the tape following that with the parity errors.

4. Program does not run to the end but aborts prior to completion.

If a program does not "FIN" the two "@DELETE" cards just before the "@FIN" card will not be read and files 040DG3 and 040DG6 will remain cataloged. It is, therefore, necessary to use the @SETC 3 card in most cases when a job does not FIN. An exception to this is when the job aborts before the @ASG cards and the four @ COPY cards near the beginning of the job are reached. In this case the job is rerun as normal with @SETC 1 since nothing has been done to change the files.

One frequent circumstance which causes a run to abort is when the JSF (Job Submittal Form) and the runstream do not agree as to which FIRST data tape is to be used. The operator will abort the job immediately and it can be rerun with @SETC 1 after the problem is rectified. If the SECOND data tape is in disagreement, the job will be partially run before aborting and it will be necessary to rerun using @SETC 3. Also, if a 99.9 card was left

out of the correction deck the job will abort with a message "ATTEMPT TO READ PAST END OF FILE." Rerun with @SETC 3 after the problem has been corrected.

A variety of hardware problems can cause the job to abort at almost any time. It is up to the user to determine how the job is to be rerun. The general rule is as follows: if the Job has "FINED" use @SETC 2; if it has not, then use @SETC 3 if the @COPY cards have been read, and @SETC 1 if they have not been read. It is most important that errors be detected when they occur and be rectified. Never run the next job until errors are corrected.

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